WHAT IS CLAIMED IS:

1. A transmitting device for transmitting optical signals in wavelength division multiplexing (WDM) optical networks, which comprises:

a light source for generating the optical signals;

an optical modulator for modulating the optical signals generated in said light source;

a pattern generator for activating said light modulator; and

a polarization scrambler for scrambling the polarization of the optical signals which are output from said light modulator after modulation.

2. A transmitting device of claim 1, wherein said pattern generator generates transmission data signals.

3. A transmitting device of claim 1, wherein said pattern generator generates transmission data signals and high frequency pilot tone.

4. A monitoring apparatus for monitoring the polarization-mode dispersion and the chromatic dispersion of optical signals in wavelength division multiplexing (WDM) optical networks, which comprises:

an optical distributor for distributing input optical signals;

a first light receiver for photoelectrically converting the optical signals to measure the frequency band of the optical signals

distributed by said distributor;

a second light receiver for photoelectrically converting the optical signals to measure the average power of the optical signals distributed by said distributor;

a filter for passing the output signals of said first light receiver only over the frequency band of interest for measuring;

a power meter for measuring the signal power over the frequency band filtered by said filter;

an analog-to-digital (A/D) converter for converting the analog signals from said first and second receivers into digital signals; and

a microprocessor for measuring the average power of the optical signals by using the digital signals from said A/D converter and monitoring the polarization-mode dispersion and the chromatic dispersion using the power values measured by said power meter.

5. A monitoring apparatus of claim 4, wherein said power meter produces the maximum value ($\mathbf{P(f)}_{max}$) and the minimum value ($\mathbf{P(f)}_{min}$) of the output signals outputted from said first light receiver according to the polarization scrambling technique, and said maximum and minimum values are expressed as follows.

$$\mathbf{P(f)}_{max} \propto \mathbf{cos}(\pi \mathbf{cDL}(\mathbf{f}/\mathbf{f}_0)^2)$$

$$\mathbf{P(f)}_{min} \propto [\mathbf{cos}^2(\pi \mathbf{f} \Delta\tau)][\mathbf{cos}(\pi \mathbf{cDL}(\mathbf{f}/\mathbf{f}_0)^2)],$$

where **c** indicates the speed of light, **D** indicates chromatic dispersion coefficient of optical fiber in ps/km/nm, **L** indicates length of optical fiber, **f** indicates frequency, and $\mathbf{f}_0$ indicates

optical frequency of optical signals, respectively.

6. A monitoring apparatus of claim 5, wherein said microprocessor monitors the polarization-mode dispersion by the ratio of the maximum power ($\mathbf{P(f)}_{max}$) and the minimum power ($\mathbf{P(f)}_{min}$) which are measured by said power meter and monitors the chromatic dispersion by the maximum power, and said polarization-mode dispersion ($\Delta\tau$) and said chromatic dispersion (**DL**) are expressed as follows.

$$\Delta\tau = \cos^{-1}(2\ \mathbf{P(f)}_{min}/\mathbf{P(f)}_{max} - 1)/(2\pi \mathbf{f})$$

$$\mathbf{DL} \propto \mathbf{P(f)}_{max},$$

where **D** indicates chromatic dispersion coefficient of optical fiber in ps/km/nm, **L** indicates length of optical fiber, and **f** indicates frequency, respectively.

7. A monitoring apparatus of claim 4, wherein said optical distributor is an optical coupler that extracts optical signals received at a constant rate.

8. A monitoring apparatus of claim 4, wherein said filter has the center frequency falling within the frequency band of the data signals when only the data signals are applied to the received optical signals.

9. A monitoring apparatus of claim 4, wherein the center frequency of said filter corresponds to the frequency of the high-frequency pilot tone when both the data signals and the extra pilot tone signals are applied to the received optical signals.